IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Somenath Mitra et al.

Application No.: 10/735,989

Filing Date: December 15, 2003

For: MICROMACHINED HEATERS FOR MICROFLUIDIC DEVICES

Group Art Unit: 3742

Examiner: Fastovsky, Leonid

Docket No: 436/12

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 CFR §1.131

I, Somenath Mitra, do hereby declare and say:

1. I am a named inventor of the above-captioned patent application.

2. I conceived the idea and fully documented my conception at least as early as June 1998. Attached are pages from my lab notebook which were generated in or around 1998.

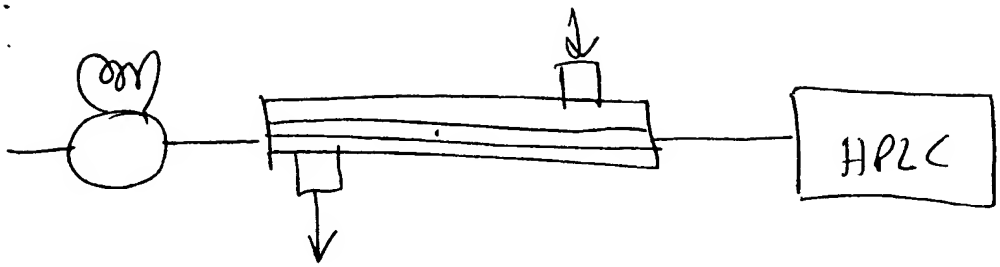
3. The lab notebook pages describe a microheater comprising at least one microchannel formed on a substrate and a conductor disposed in the at least one microchannel.

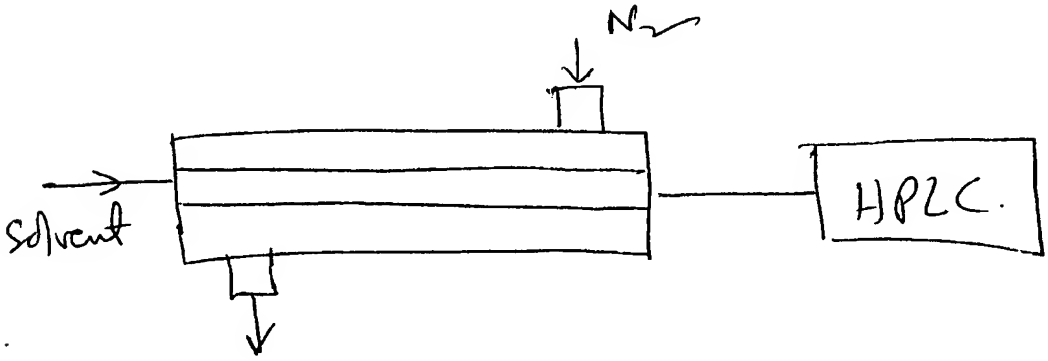
4. From the time I conceived the invention until the time the patent application was filed I worked diligently on the completion of the invention.

5. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and that these statements were made with the knowledge that willful false statements and the likes so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patents issuing thereon.

Somenath Mitra

Date: 8/5, 2006





Real-time monitoring of a solvent stream containing semivolatiles

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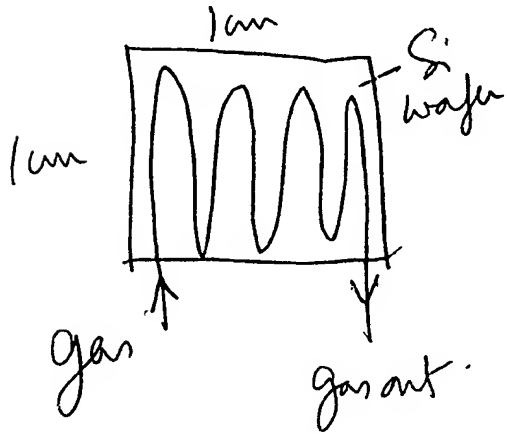
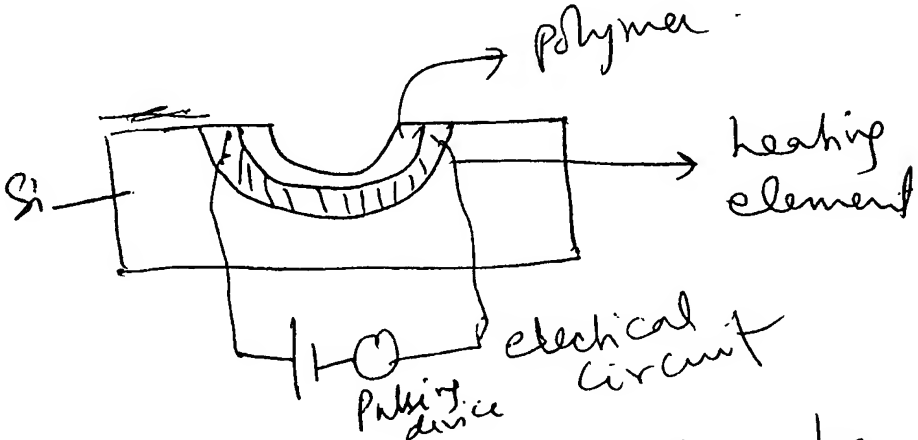
Microchip on a chip

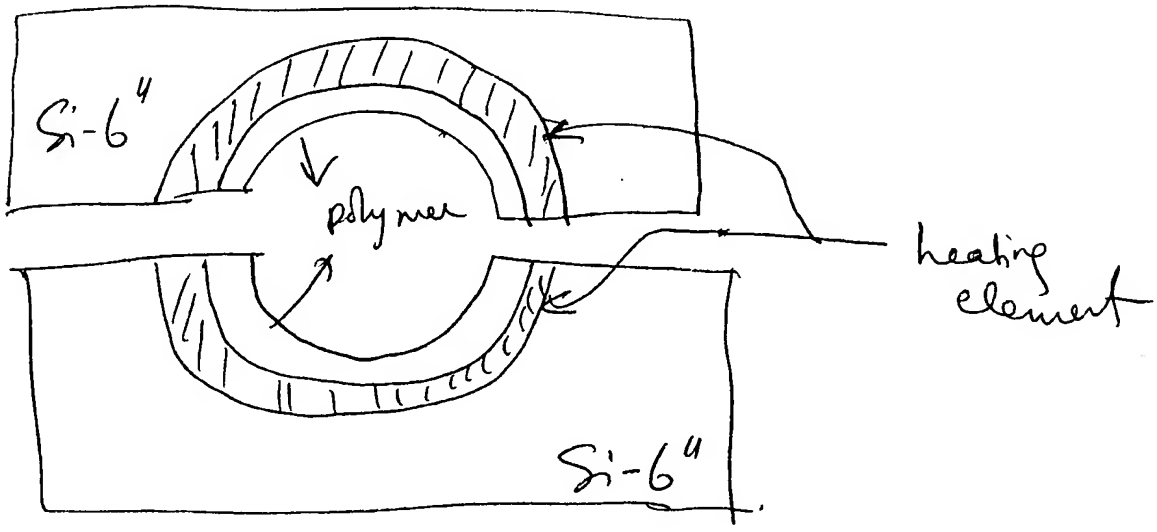


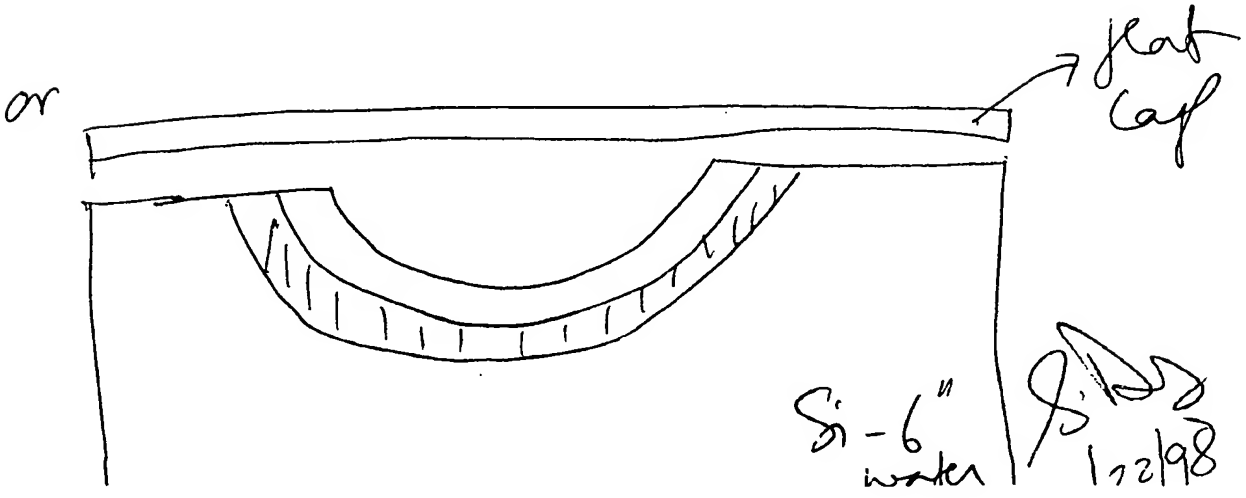


The length of the microchip can be increased by increasing length of channel.

The heating element can be a layer of metal or of electrical heating paint, like the ones we used before from auto stores.

Two mirror images can be put on top of each other





m "chip".

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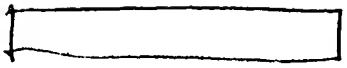
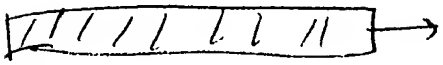
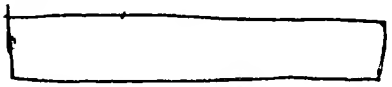


Si wafer



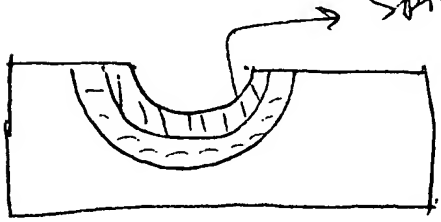
mask, Lithography



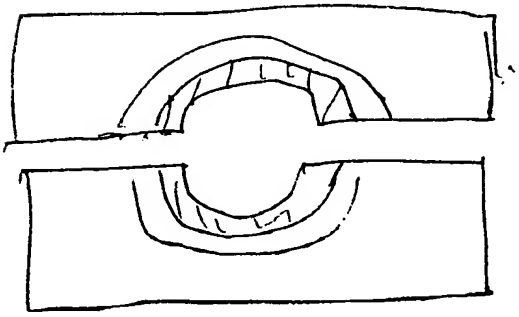
Etch

etch channel

Spin coat
heating film
of conducting polymer.
or Implant or sputter
a metal.



Spin coat polymer
or deposit by
other
means



Band mirror
images

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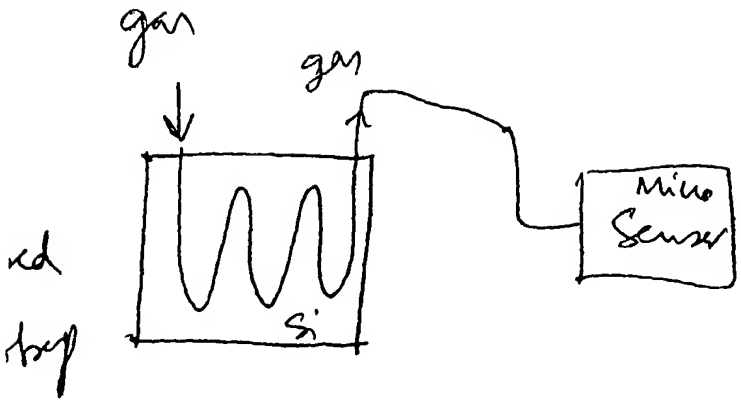
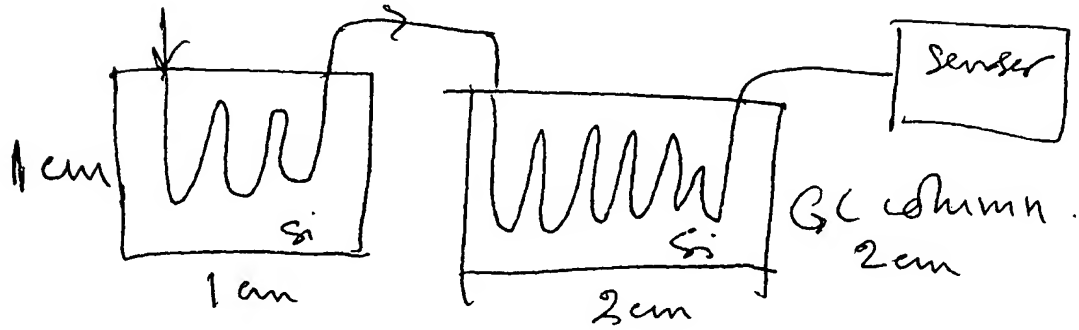


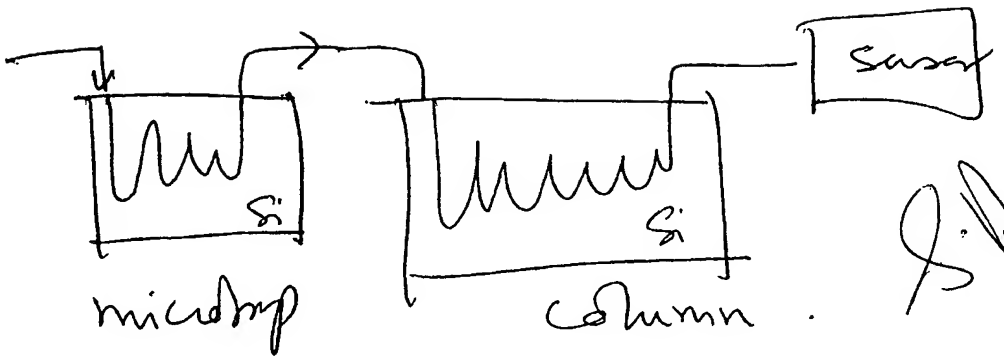
all on one wafer

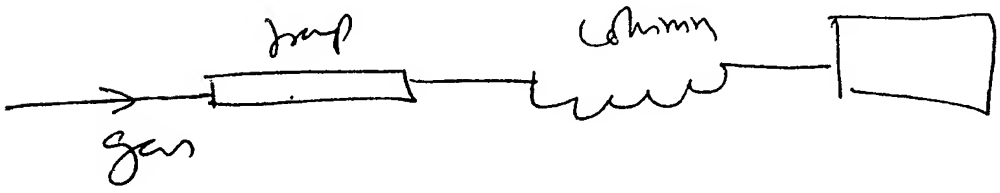


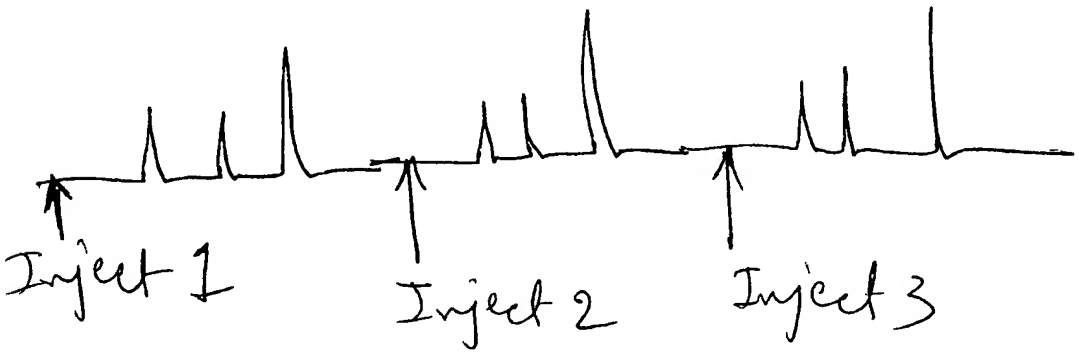
Same architecture, 1st device as microtrap, second as GC column, Sensor as detector.

Microtrap — high capacity, pulsed operation

GC column — low capacity, heat by temperature programming. Increase current slowly through the conductive layer, leading to temperature ramp.







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microtrap & column on same device.

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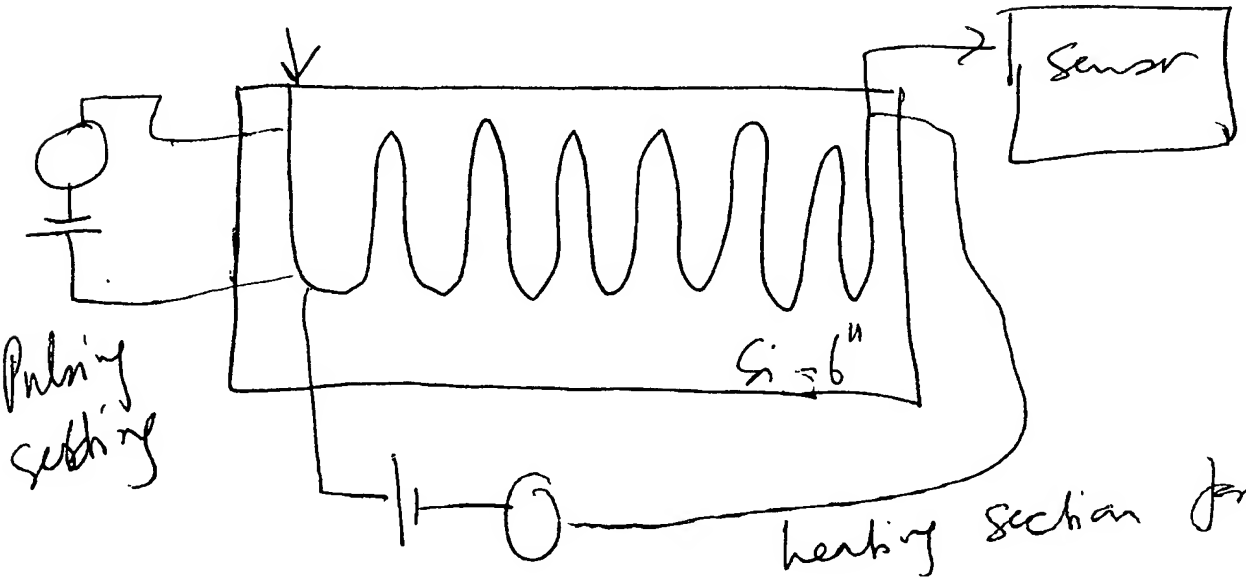

The heating element & polymers are different in the two sections.

In the first section its a high capacity polymer that retains strongly. In the latter section its a GC, so, low capacity.

Heating for the first section for injection/pulsing. The latter section for slow heating & temperature programming

Sidney John